

REMARKS

Applicant respectfully requests reconsideration and allowance of the subject application in view of the foregoing amendments and the following remarks.

The foregoing amendments to the Specification and Fig. 4 in the drawings correct the reference number for the bundle from 430 to 440 so that the references are in agreement with the other parts of the specification. Support for the amendment is found at paragraph [0029]. No new matter is added.

Claims 1-12, 14 and 17-24 are pending in the application, with claims 1, 12, and 19 being independent. Claims 13, 15 & 16 were previously canceled, and no additional claims are canceled. Claims 1, 2, 5, 6, 12, 14, 17, and 19 are amended herein. Support for the claim amendments can be found in the original disclosure at least at paragraphs [0030], [0037]-[0039], and [0044]. No new matter has been added.

§ 103 REJECTIONS

Claims 1-12, 14, and 17-24 stand rejected under 35 U.S.C. § 103(a) as being obvious over Dussud, U.S. Patent No. 6,502,111 in view of Applicant's allegedly admitted prior art. Applicant respectfully traverses the rejection. Nevertheless, without conceding the propriety of the

rejection and in the interest of expediting allowance of the application, claims 1, 12, and 19 have been amended as proposed during the interview and are believed to be allowable.

Independent Claim 1:

As presently presented, claim 1 is directed to and recites, among other things: A computer-readable storage medium apparatus having computer-executable instructions, ..., the instructions comprising:

requesting a list from a tracking mechanism, the list identifying a plurality of memory locations that have been accessed since a last ephemeral garbage collection process, each memory location corresponding to one of a plurality of cards associated with one or more objects allocated from within a memory heap, each of the plurality of cards associated with a card table, wherein the card table identifies one or more of the plurality of cards with one or more objects that have been accessed;

creating, *during the ephemeral garbage collection process*, a bundle table containing entries identifying a plurality of bundles, wherein each of the plurality of bundles identifies groupings of subsets of the plurality of cards;

marking, *during the ephemeral garbage collection process*, two or more of the plurality of bundles identified in the bundle table using the list,

...

performing garbage collection upon the at least one accessed object.

In the Rejection the Examiner states:

"As per claim 1, Dussud discloses a computer-readable storage medium apparatus having computer-executable instructions for performing ephemeral garbage collection, the computer readable storage medium being accessible by a computing device, the instructions comprising: requesting a list from a tracking mechanism, the list identifying a plurality of memory locations that have been accessed since a last ephemeral garbage collection, each memory location corresponding to one of a plurality of cards associated with a card table, wherein the card table identifies one or more of the plurality of cards with one or more objects that have been accessed, each of the plurality of cards being associated with the one or more objects allocated from within a memory heap." (Action p. 4).

The Examiner also acknowledges that Dussud:

"Dussud does not disclose creating a bundle table containing entries identifying a plurality of bundles, wherein each of the plurality of bundles identifies groupings of subsets of the plurality of cards; marking two or more of the plurality of bundles identified in the bundle table using the list, wherein the marked bundles identify

groupings of subsets of the plurality of marked cards having associated objects that have been accessed since a last garbage collection process; for each marked bundle identified in the bundle table, determining at least one marked card in a grouping of subsets of the plurality of marked cards identified by the marked bundle; for each determined marked card, determining at least one accessed object within associated with the marked card;" (Action p. 4)

The Examiner contends that AAPA discloses these missing elements by analogous elements. (Action p. 4-5).

However, Dussud and AAPA fail to disclose or suggest creating and marking the bundle "during the ephemeral garbage collection process," as presently recited in independent claim 1.

Thus, Dussud and AAPA, whether taken alone or in combination (assuming for the sake of argument that they can be combined), fail to disclose or suggest the features of claim 1. Accordingly, as discussed during the interview, independent claim 1 is allowable over the cited documents.

Dependent claims 2-11 depend from independent claim 1 and are allowable over the cited documents by virtue of this dependency, as well as

for additional features that they recite. Applicant also respectfully requests individual consideration of each dependent claim.

Independent claim 12:

As presently presented, claim 12 is directed to and recites, among other things: A method for executing statements within a program to support ephemeral garbage collection, the method comprising: specifying a range of card table memory to watch during program execution by calling a write-watch mechanism ...

marking one of the plurality of cards within the card table memory corresponding to the memory location;

tracking access to the card table memory *by the write-watch write watch mechanism*;

creating, during an ephemeral garbage collection process, one or more bundle tables containing entries identifying groupings of the cards in the plurality of bundles, for each stored statement within the program, the ephemeral garbage collection process occurring after the program execution process;

updating, during the ephemeral garbage collection process, at least one bundle table ...;

for each marked bundle table, determining *during the ephemeral garbage collection process* at least one marked card in a grouping of the plurality of marked cards identified by the marked bundle table;

for each marked card, determining *during the ephemeral garbage collection process* at least one accessed object associated with the marked card; and
performing garbage collection *during the ephemeral garbage collection process* upon the at least one accessed object.

Dussud and AAPA fail to disclose or suggest “creating, during an ephemeral garbage collection process, one or more bundle tables,” ... and updating, determining, or performing “during the ephemeral garbage collection process.” Thus, Dussud and AAPA, whether taken alone or in combination, fail to disclose or suggest the features of claim 12. Accordingly, as discussed during the interview, independent claim 12 is allowable over the cited documents.

Dependent claims 14, 17, and 18 depend from independent claim 12 and are allowable over the cited documents by virtue of this dependency, as well as for additional features that they recite. Applicant also respectfully requests individual consideration of each dependent claim.

Independent Claim 19

As presently presented, claim 19 is directed to and recites, among other things: a memory management system comprising:

....

the system being configured to:

... wherein the card table identifies one or more cards that have been accessed, the card table and cards being marked to identify the one or more of the plurality of cards with the one or more objects that have been accessed, *during a first program execution process exclusive of an ephemeral garbage collection process;*

creating, during the ephemeral garbage collection process, one or more bundle tables...

updating, *during the ephemeral garbage collection process*, at least one bundle table by marking bundles within the bundle table...;

determine, *during the ephemeral garbage collection process*, for each marked bundle within the bundle table, ...;

determine, *during the ephemeral garbage collection process*, for each marked card, the one or more objects that have been accessed; and

perform, *during the ephemeral garbage collection process*, garbage collection upon the one or more accessed objects.

Dussud and AAPA fail to disclose or suggest a system wherein "*the card table and cards being marked to identify the one or more of the plurality of cards with the one or more objects that have been accessed, during a first program execution process exclusive of an ephemeral garbage collection process;*" ... and creating, updating, determining marked bundles and marked cards "during the ephemeral garbage collection process." Thus, Dussud and AAPA, whether taken alone or in combination (assuming for the

sake of argument that they can be combined), fail to disclose or suggest the features of claim 19. Accordingly, as discussed during the interview, independent claim 19 is allowable over the cited documents.

Dependent claims 20-24 depend from independent claim 19 and are allowable over the cited documents by virtue of this dependency, as well as for additional features that they recite. Applicant also respectfully requests individual consideration of each dependent claim.

Therefore, for at least the reasons set forth above, it is respectfully submitted that the present rejections under 35 U.S.C. §103(a) should be reconsidered and withdrawn.

CONCLUSION

For at least the foregoing reasons, it is respectfully submitted that claims 1-12, 14 and 17-24 are in condition for allowance over the cited documents. Applicant respectfully requests reconsideration and withdrawal of the rejections and an early notice of allowance.

If any issue remains unresolved that would prevent allowance of this case, **Applicant requests that the Examiner contact the undersigned attorney to resolve the issue.**

Respectfully submitted,

Lee & Hayes, PLLC

Representatives for Applicant

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